

Note No.	SVC-FSB-0017 Rev. A
Release Date	10/19/2015
Contact	ngceoservice@ngc.com

eDrive RF Module Calibration

Summary

This technical note describes the programming procedure for calibrating the 4U eDrive RF Module used with the eDrive Q Switch percent output feature.

Materials and Equipment

- Oscilloscope, Tektronix Model TDS 3012
- RF Directional Coupler, RLC Electronics P.N. M-3106
- Watt Meter, Byrd ThruLine Model 43
- Plug-In Element, Byrd 50W
- RF Load, Byrd Model 150-T-FN
- BNC Cables, 4 each

Programming Instructions

1. Before starting the calibration procedure, use the Byrd Watt meter, 50W plug-in element, and RF load to verify that the RF output power is set for the specific application. For example, if the eDrive is being used with the PA-016 Patara laser, the RF output should be set to 25W. If the RF power is changed, the calibration will need to be redone.
2. With the eDrive connected to the RF load, enable the Q Switch; warm up the RF driver for 10 minutes.
3. Use BNC cables to connect the eDrive **RF OUT 1** to the RF Directional Coupler. Connect the RF Directional Coupler to the RF load. Connect the -30db output from the directional coupler to one channel of the oscilloscope. Attach the eDrive **TRIGGER OUT** to the other channel of the oscilloscope. Set the oscilloscope time base to about 4uS. Set the oscilloscope vertical scale to about 50mV.
4. Set the Q Switch frequency to 9 kHz, and set the Q Switch window width to 5 us. Verify that the Q Switch is **Enabled**.
5. Push the Emission button to start the eDrive generating QSW pulses. Verify that you can see the Q Switch window as shown in Figure 1 before proceeding.
6. Adjust the oscilloscope for full screen display of the RF output waveform. Move the trigger pulse up off of the display. See Figure 2.
7. See Table 1. Measure the peak to peak value of the RF energy. Calculate the following calibration point values: RF peak to peak x 0.95, RF peak to peak x 0.9, RF peak to peak x 0.80, RF peak to peak x 0.2, RF peak to peak x 0.1, and 0.

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- On the eDrive front panel menu go to: **Channel Setup / Q-Switch / -more- / RF Calib.** This menu will tell you whether the RF module has been calibrated: **YES**, or you can select **Run Calib.**
- Select the **Run Calib.** Button to start the calibration. You may cancel the calibration anytime by selecting **Cancel**. The RF power level in the Q Switch window will be at maximum on the oscilloscope when the calibration starts; this is the 100 percent point.
- The eDrive menu will ask you to set the RF power level in the Q Switch window to one of the RF peak to peak values calculated in step 7. Rotate the adjustment knob to reduce the RF power level in the Q Switch window to the calibration point. Rotating the knob changes the raw DAC value driving the RF module. Lower DAC numbers will create less RF energy (more open) in the Q Switch window. The first point may take a lot of change in the DAC value to see a reduction of RF power in the Q Switch window. Push the **Accept** button when the calibration point peak to peak reading is achieved.
- Repeat the previous step for all calibration points. Note that when you reach the last calibration point of zero, you are looking for the point where the Q Switch RF energy completely shuts off. The calibration data is not saved until you accept the zero calibration point.
- Push emission to turn the laser output off. The eDrive power needs to be turned off and back on for the calibration data to be loaded for use.

Percent	Peak to Peak	Assoc. DAC
100	377	3875
95	358	3575
90	339	3275
80	302	2865
20	75	1895
10	38	1695
0	0	1395

Table 1 Example Peak to Peak and DAC Values

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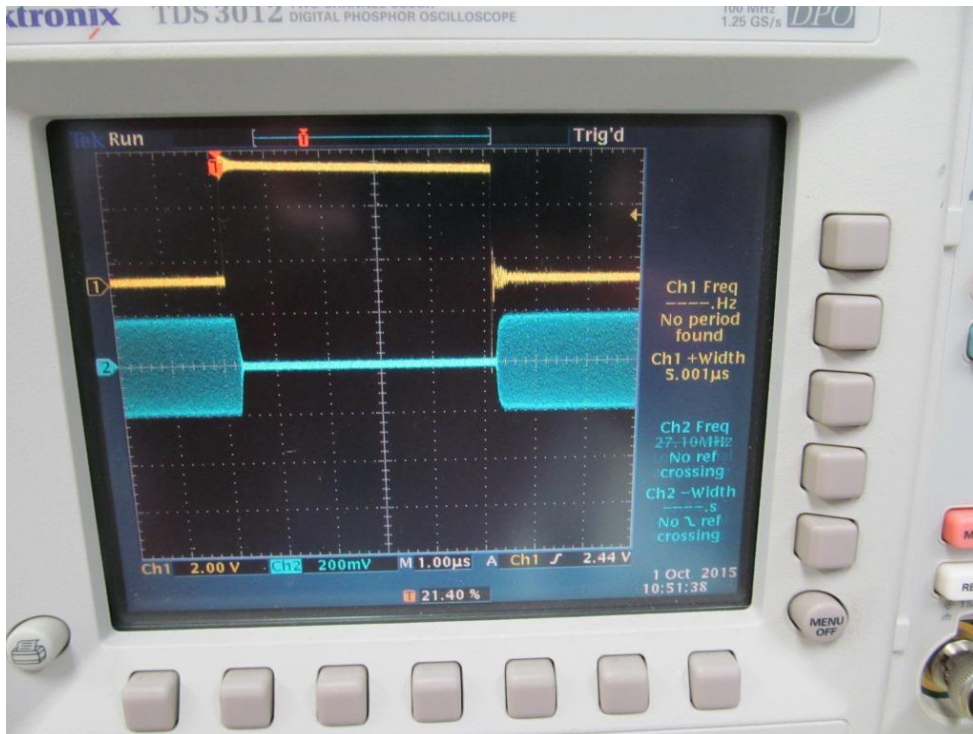


Figure 1 Trigger and RF Waveform

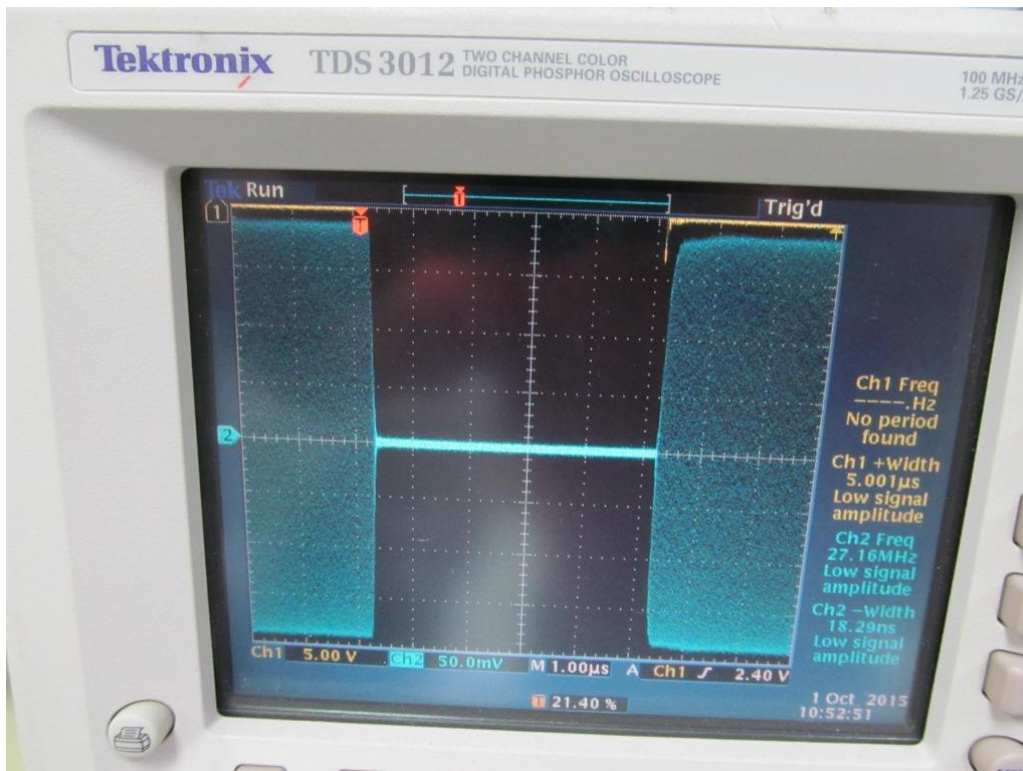


Figure 2 RF Output Waveform

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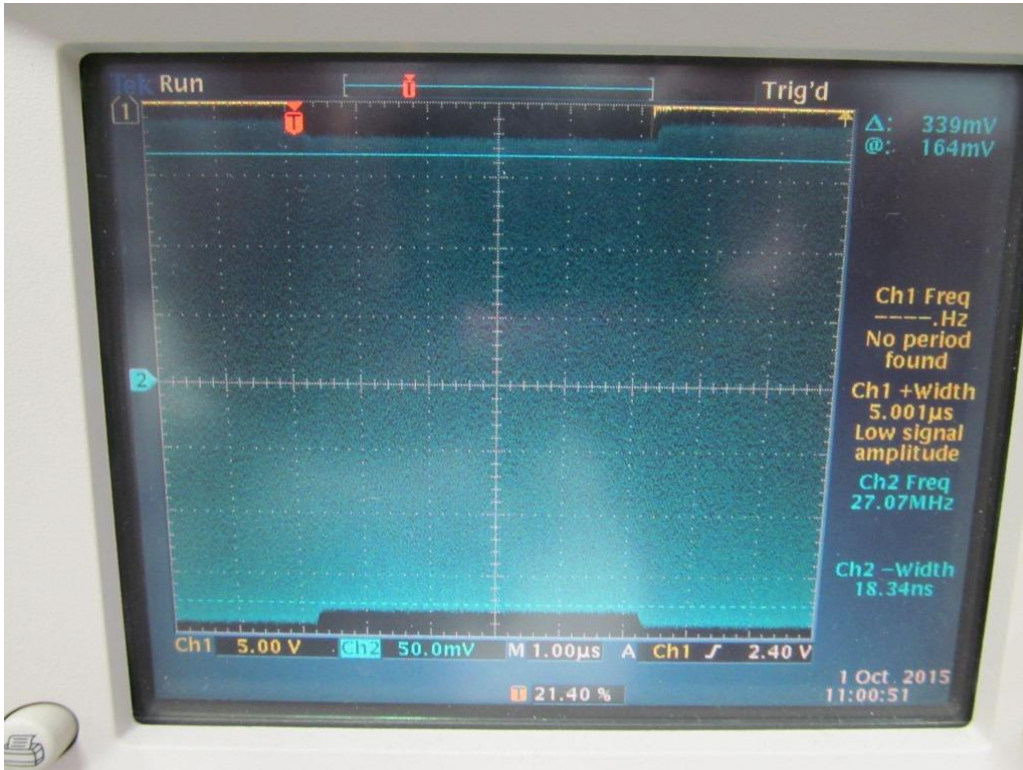


Figure 3 Calibrate RF, 95 Percent